Tactical Unmanned Aerial Vehicle
Life Cycle Supportability

Contractor Insights

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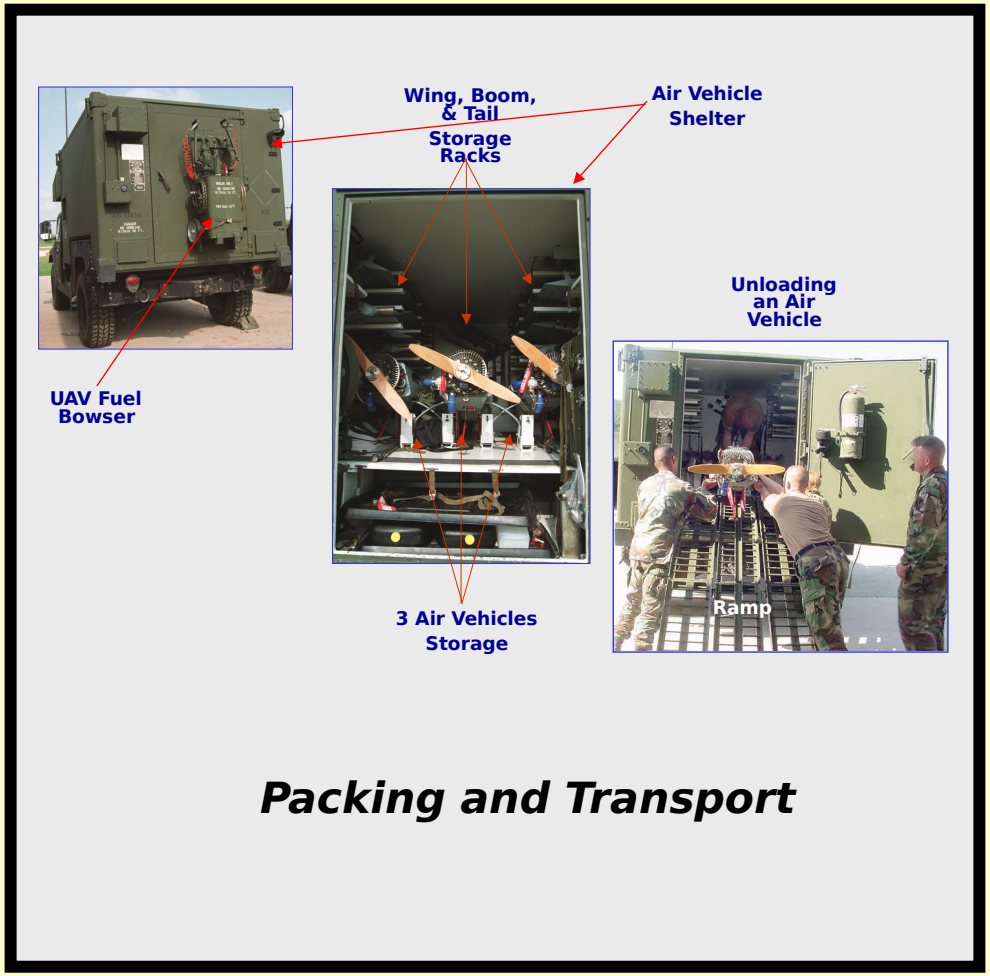
Tactical Unmanned Aerial Vehicle

- a ground maneuver commander's primary day/night, Reconnaissance, Surveillance, and Target Acquisition (RSTA) system

- provides
  - enhanced enemy situational awareness target acquisition capability
  - battle damage assessment (BDA)
  - enhanced battle management capabilities (friendly situation and battlefield visualization)

- the combination of these benefits contributes to dominant situational awareness



Packing and Transport

Acquisition Challenges: Preparing For Supportability

Shadow™ TUAV System Composition

Ground Control Station (GCS) and Antenna

Shadow 200 UAV w/Payload

Personnel Transport

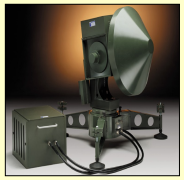
System Components	Qty/Sys
• Shadow UAV & Payloads	4
• Ground Control Station & Antenna	2
• Auto Launcher	1
• TUAV Auto-Land System	1
• Portable GCS and Antenna	1
• Air Vehicle Transport	1
• Remote Video Terminal & Antenna	4
• Personnel/Maintenance Transport	3
• Equipment Trailers	2

Air Vehicle Transport

Remote Video Terminal and Antenna

Portable Ground Control Station and Antenna

Automatic Launch and Recovery



TUAV Auto-Land System (TALS)

Developing UAV Systems for a Tactical Environment is a Difficult, Iterative Process

- Evaluating, selecting and maturing technologies
- Conducting trade studies
- Developing system specifications
- Utilizing modeling and simulation
- Optimizing for UAV performance and tactical deployability

Action Required and Purpose	Evaluate Impact on:
• Air vehicle (AV) mods required for ruggedness necessary for ground transport/handling in tactical environment.	• Weight, size and drag impact on flying performance, e.g. endurance, ceiling, etc.
• AV mods (e.g. directional/multiple antennas, antenna placement, power amplifiers, additional transmitters/ receivers) for comm connectivity with ground units	• Weight, size, drag and horsepower extraction impact on flying performance, e.g. endurance, ceiling, etc.
• Data Link features to accommodate network comm among multiple air vehicles and ground locations	• Comm range requirements/impact on power, bandwidth and antenna gains needed in AV and ground vehicles (GVs).
• Constraints of AV durability, fueling,	• Weight, size and power impact on

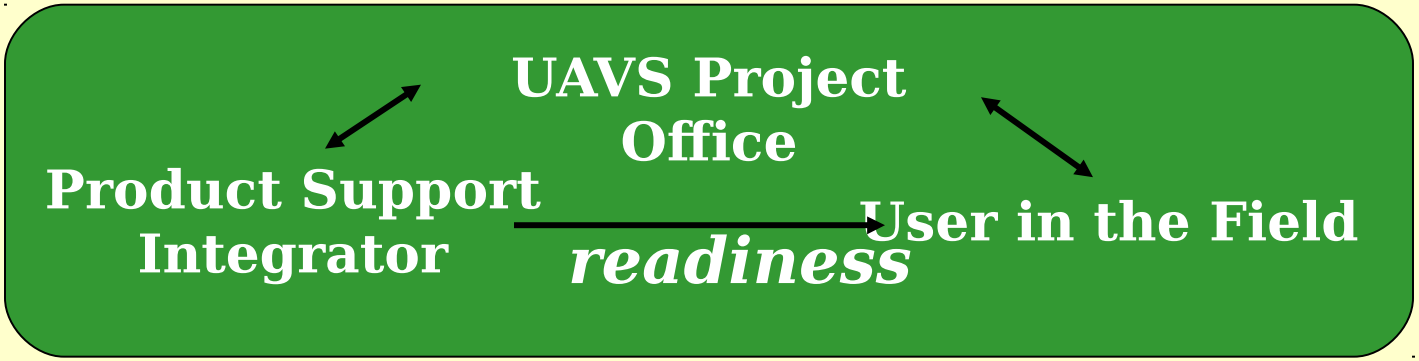
Two Sides of the Same Coin

- **No argument about UAVs being more and more important for the full spectrum of direct combat operations**
- **Regardless of mission, we have to abide by fundamentals:**
  - Cost effectiveness,
  - High reliability and high availability,
  - Modular systems with simple logistical support concepts
  - “Plug and play” mission packages built along the same replaceable concepts as home and office computers.
  - UAVs are aircraft that have to operate among other aircraft

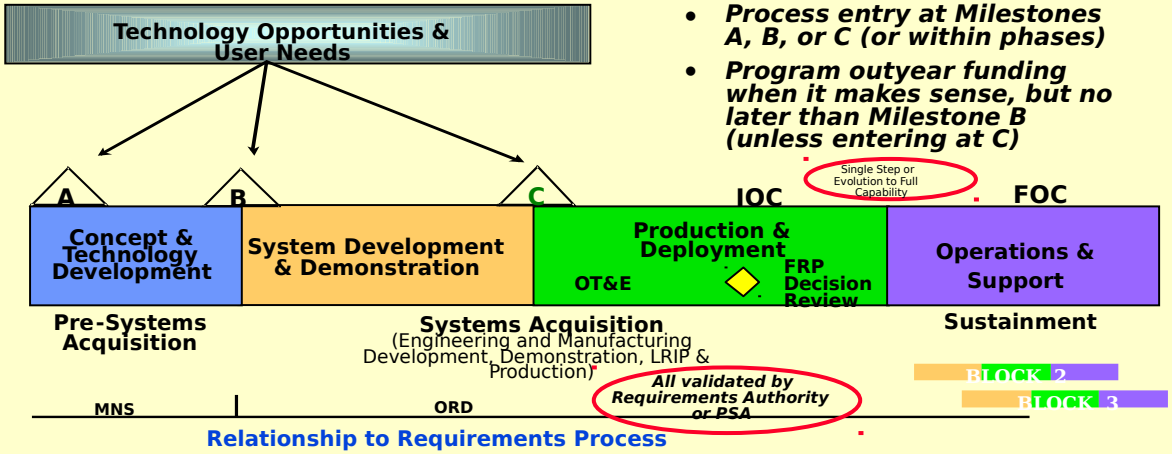
Keys To Successful UAV System Acquisition and Fielding

- **Optimize UAV requirements with respect to operational effectiveness, AND system suitability AND affordability.**
- **Don’t make individual UAVs so expensive that Commanders are reluctant to use them when and where they’re needed**
- **Remember always that UAVs must be operated in conjunction with manned aircraft AND maintained properly by REAL SOLDIERS to be available when and where the Commander needs them**
- **Pay attention to lessons learned acquiring and fielding UAV Systems in the past to exploit the successes and avoid the mistakes**

Embracing the UAVS Performance Based Logistics (PBL) Vision



THE 5000 MODEL



- *Process entry at Milestones A, B, or C (or within phases)*
- *Program outyear funding when it makes sense, but no later than Milestone B (unless entering at C)*

Meeting the UAVS PBL Challenges

- **Readiness = Performance Under Wartime and Peacetime Conditions**
  - **Equipment Reliability**
  - **Effective Supply Chain Management**
  - **Highly Skilled and Focused Support Infrastructure**
- **Training**
- **Affordability**

Operation Iraqi Freedom

Shadow™ 200 TUAV Supports 4ID

"According to Lt. Col. Todd A. Megill, the battalion commander of the 104th Military Intelligence, it [Shadow™ 200] is one of the best UAVs available."

June 25, 2003
Spc. Derek Dexter, 350th Mobile Public Affairs Detachment

"Wherever the Shadow™ goes, U.S. forces will have a distinct advantage over any adversary…" Lt. Col. James Stockmoe, commander of the 102nd Military Intelligence Battalion…

U.S. Army News Release

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

”Like many soldiers, this is the Shadow’s™ first deployment. Taskforce Ironhorse is the first organization to test; field; and use in combat this particular UAV.”

June 25, 2003
Spc. Derek Dexter, 350th Mobile Public Affairs Detachment

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

“The UAV flies mainly at night, and on several occasions was employed to scout a town or area for several days before U.S. forces moved in for a raid.”

September 25, 2003
Robert Wall, Aviation Week

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

…"we're operating roughly six times what we would expect to operate in peacetime," John Sundberg [U.S. Army UAVS Project Office] said. "This has been a pretty good test of reliability and maintainability and so far we're doing pretty well, I think.“

September 25, 2003
Ann Roosevelt, Defense Daily

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

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“ “All the brigade commanders fight over who gets to use them,” said Megill, referring to the Shadow™. “It’s a great system. It’s providing very useful information to commanders.” ”

June 25, 2003
Spc. Derek Dexter, 350th Mobile Public Affairs Detachment

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

“ “ We can get excellent images from that height and speed,” said Megill. “It also makes [the Shadow™] difficult to see.” Megill added none of the UAVs have been lost in combat.” ”

June 25, 2003
Spc. Derek Dexter, 350th Mobile Public Affairs Detachment

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

“In recent weeks, the company has resorted to commercial air carriers to move parts faster than is possible with military transport…”

September 25, 2003
Ann Roosevelt, Defense Daily

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

“AAI has set up a Shadow™ repair facility in Kuwait and maintains personnel with the deployed units.”

September 22, 2003
Robert Wall, Aviation Week

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

“These pilots are usually on shift for 12 hours a day and average three flights a shift. Each of the platoons in charge of the UAVs has over 600 flight hours.”

June 25, 2003
Spc. Derek Dexter, 350th Mobile Public Affairs Detachment

Operation Iraqi Freedom
Shadow™ 200 TUAV Supports 4ID

Current flight summary as of Sep 29, 2003:

Total: 561 flights for 2256 hours

September 29, 2003
AAI Corporation

It’s All About Soldiers Operating TUAVs in the Field

“…the feedback the UAV Program Office is getting is that "the soldiers are extremely happy with what they have and they want more.“

September 25, 2003
Ann Roosevelt, Defense Daily